





EPA Study of Hydraulic Fracturing and Drinking Water Resources


Office of Research and Development




Hydraulic Fracturing Study

In its FY2010 Appropriations Committee Conference Report, Congress directed EPA to study the relationship between hydraulic fracturing and drinking water, using:

- Best available science
- Independent sources of information
- Transparent, peer-reviewed process
- Consultation with others





Public Health Concerns

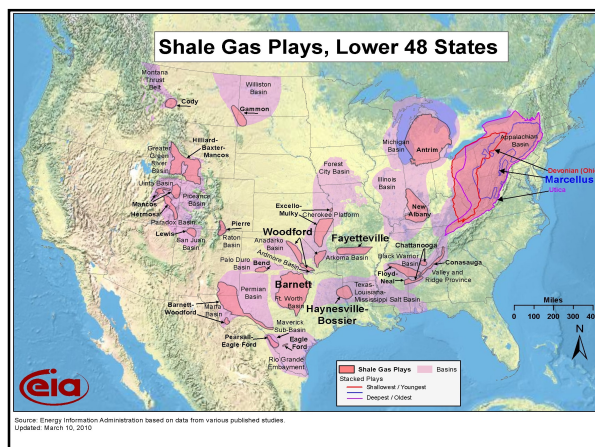
- Gas well blowouts, air emissions and fluid spills have occurred
- Contamination of drinking water due to fracturing operations has been reported
- Questions remain regarding how and why these impacts may be occurring

The public has a right to expect that public health and the environment are protected, and that their concerns are addressed

Natural Gas Extraction

- Natural gas is an abundant domestic source of energy
- Application of **hydraulic fracturing** and high volume **horizontal drilling** has enabled economic extraction of gas from shale formations deep below the surface
 - Rapid expansion across the U.S.
 - Development in new regions
 - International growth

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Highly Industrialized Process



Fleet of trucks used to transport water and fluids to well site

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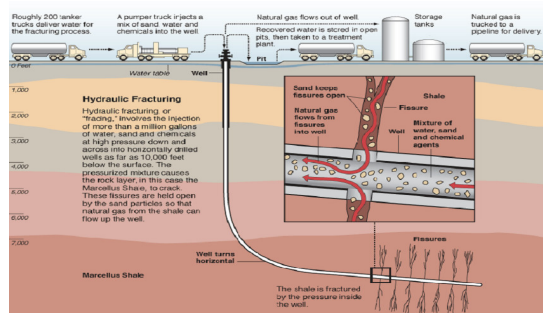
Gas Well Field



Gas Well Pads in Wyoming

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Hydraulic Fracturing Schematic



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Study Plan Development

- Initial recommendations by EPA's Science Advisory Board (April, 2010)
 - Focus on drinking water resources (quality and quantity)
 - Include case study approach
 - Stakeholder process important
- Study plan being finalized, to be provided to new SAB committee in January 2011

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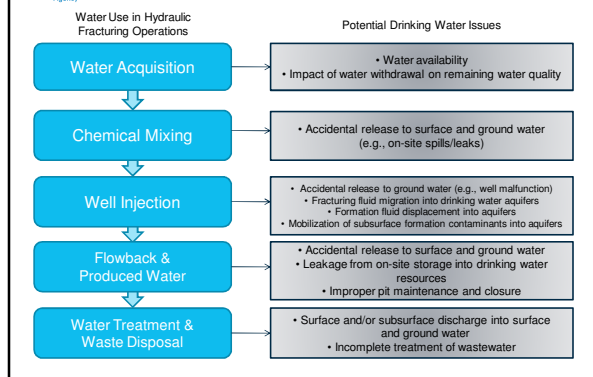
How the Study Plan was Developed

- SAB suggestions
- Stakeholder input
- EPA workgroup advice (programs and regions)
- ORD Lab/center/office contributions
- Literature review

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Study Will Follow HF Water Cycle





Study Plan Approach

- Primary focus on the potential impacts of hydraulic fracturing on drinking water resources
 - Review and analysis of available data
 - Case studies
 - Modeling – fate and transport
 - Analytical chemistry methods, evaluation of indicators

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Case Studies

- Opportunity to evaluate hydraulic fracturing in different parts of the U.S.
- Retrospective and prospective
- Identification and selection
 - Stakeholder suggestions
 - Vulnerable water resources
 - Proximity of other wells
 - Extent of activity (# wells/acre)
 - Geologic conditions
 - Geographic variations



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Fate and Transport

- Characterize fracturing fluids and their degradation products
- Determine the potential to mobilize chemicals from geological formations
- Model the fate and transport of chemicals in the subsurface
- Identify and refine methods for chemical analysis

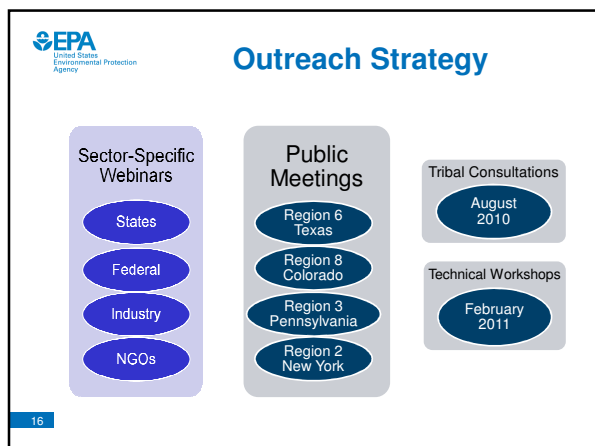
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Collaborations

- Industry and other stakeholders
 - Provided input on scope of study plan
 - Share information, access to sites
 - Collaboration on prospective case studies
- Federal agencies
 - Review draft study plan
 - Access sites on public lands, collaborate on case studies
 - Share data
- State and interstate agencies
 - Collaborate during case studies
 - Share data
- Technical workshops
 - Offer opportunity for input from scientists, engineers, other experts
 - Discuss mechanical well integrity and siting, water resource management, and chemical and analytical issues

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Information Requests

- EPA issued a request to nine hydraulic fracturing companies to voluntarily submit information on hydraulic fracturing for the study
- Information requested
 - Chemical composition of fracturing fluid products
 - Data on the health and environmental impacts of the products and constituent chemicals
 - Detailed information on the hydraulic fracturing process
 - Sites where the companies have fractured and where they will fracture

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